Mount Rainier National Park

Sister Mountain Project

Wild Wapati	
Overview	By playing a game of tag outside, students portray animal and habitat components of Mt. Rainier.
Grade Level	5-8
Objectives	• Identify and describe the three essential components of any habitat to be water, shelter, and food. • Identify factors that affect carrying capacity. • Define "limiting factors" and give examples. • Be aware of changes in wildlife populations can be natural on Mt. Rainier .
Setting	Outside field or indoor gymnasium or other large open room.
Timeframe	30 minutes
Materials	✓ An area-either indoors or outdoors- large enough for students to run around ✓ Chalkboard or flip chart ✓ Writing materials
Vocabulary	Habitat, Limiting Factors, Predator, Prey, Population, Balance of Nature, Ecosystem, Carrying Capacity
Standards	6-8 LS2D Ecosystems are continuously changing. Causes of these changes include nonliving factors such as the amount of light, range of temperatures, and availability of water, as well as living factors such as the disappearance of different species through disease, predation, habitat destruction and overuse of resources or the introduction of new species. 6-8 LS2B Energy flows through an ecosystem from producers (plants) to consumers to decomposers. These relationships can be shown for specific populations in a food web. 6-8 SYSA Any system may be thought of as containing subsystems and as being a subsystem of a larger system 6-8 SYSF The natural and designed world is complex; it is too large and complicated to investigate and comprehend all at once. Scientists and

	students learn to define small portions for the convenience of investigation. The units of investigation can be referred to as "systems." 6-8 INQE —Model— Models are used to represent objects, events, systems, and processes. Models can be used to test hypotheses and better understand phenomena, but they have limitations. 6-8 INQG —Communicate Clearly— Scientific reports should enable another investigator to repeat the study to check the results.
Background	Nature is always changing and wildlife populations are not static. They fluctuate in response to a variety of stimulation and limiting factors. The balance between what animals need to live and the number of animals a habitat can support is known as carrying capacity. Carrying capacity affects the ability of wildlife species to successfully reproduce to maintain their populations over time. The most basic of life's necessities for living organisms are food, water, shelter, and space in a suitable arrangement. If any of these components are out of balance a species population in that habitat will be effected in one way or another. There are factors that will keep populations in check from keeping a particular species to reproduce out of control. These factors include disease, predator and prey relationships, varying impacts of weather conditions from season to season (e.g. early freezing, heavy snows, flooding, and drought), accidents, environmental pollution, and habitat destruction are among these factors. Although, too much exposure to one of these limiting factors can result in threatening, endangering, or eliminating the whole species. Since all habitats have a finite amount of resources for life, carrying capacity limitations (limiting factors) can result in competition among all those depending on that ecosystem for survival. Thus populations can go through a natural fluctuation growth or decline depending on things like seasons, migrations, etc. An unusual population cycle that is found on in the Cascades and Olympics is the long tailed vole. They, as far as scientists can tell, have a mysterious hormonal/behavioral causes population swing on a three or 4 year cycle by a sort of mass starvation to prevent whole species extinction. Besides the previous example, usually the most fundamental and critical limiting factors are those main components of habitat: food, water, shelter, and space. With this game, students should walk away from this lesson with the ideas that: • Good habitat is the key to wildlife survival • A population will continue to increase in size until some limiting

	factors are imposed • Limiting factors contribute to fluctuations in wildlife populations, and • Nature is never in "balance," but is always changing • Everything in natural systems is interrelated • Populations of animals are continually changing in a process of maintaining equilibrium The Shawnee used the word wapiti to refer to elk, as it means "white rump." They eat understory vegetation like vine maples and especially salmonberries. Elk herds have a social hierarchy, where the females will follow the most mature; and the largest bull (male elk) gets to tag along with the group. Other males will be driven off until this bull can't defend himself anymore, which could be the next season since it's hard work taking care of all the females in the herd.
Procedure	**Warm-up** 1. Ask students what things are needed to survive and make a list of things on the board. Explain or review the essential components of habitat with students (food, water, shelter, and space in a suitable arrangement). **Activity** 2. The game is structured around food, water, and shelter, but it should be noted that space should not be forgotten and is very important for animal populations to reach maximum size. This of course is the goal of all animal species. 3. Divide, by numbering off for example, students into four groups. Have each group go to a corner of the room or designated boundary of a field. Mark two parallel lines on the ground or floor ten to twenty yards apart. Have one group line up behind one line and the rest of the groups (put groups two, three, and four into one large group) line up on the other line facing the first group. 4. The first group is designated the wild wapiti (be sure to explain where the word came from as stated in the background).Since all elk need a suitable habitat to survive, assume that it has all the space it needs. The elk (group one) have to find all the components of habitat it needs to survive. Tell which specific component the elk is looking for, he/she will use specific hand gestures illustrating either food, shelter, or water. To show that an elk is looking for food one should hold its "hooves" over its stomach. When an elk is looking for food, it should hold its "hooves" over his/her mouth. To show that an elk is

	looking for shelter, it holds its "hooves" together over its head. An elk chooses one habitat component each round, and cannot change until the next round (if it survives). 5. Each person in the larger second group chooses which habitat components they want to represent, food, water, or shelter. That student then makes the hand gesture that represents the component (i.e. hands on stomach for food, and so on). 6. The game begins when all players line up behind their respective line, backs to backs. With all students making their chosen sign, there should be some variety shown for food, water, and shelter. Later on in the game students might strategize and make only a certain sign, which is fine but don't encourage it. If students switching their signs mid round could be a problem then tokens, bandannas, or colored sheets of paper could be grabbed at the beginning of each round representing a different sign. 7. When the students are ready, say "Wild Wapiti!" Each student turns around to face the opposite group, continuing to hold their signs clearly. 8. When an elk sees the matching sign it is looking for (i.e. the elk has his/her hands covering their mouth then they would be looking for a person from the other group holding their hands over their mouth representing water), they should run to that person and "capture" the matching element. The sign has to be held until the elk reaches the matching person. Capturing a component is equal to an elk drinking water, eating food, or finding shelter. Thus the elk is able to reproduce, and would be encourage to make a bugle mating call (you could play a clip for an example found at http://www.junglewalk.com/sound/Moose-sounds.htm). If two elk go for the same component the elk who reaches that component first gets to "consume" it. If a habitat component is not consumed that person just stays where they are holding up their sign and can change signs next round. The "consumed" component and elk head back to the elk line and the component then becomes an elk looking for another component next round. 9. Record the number of elk at the beginning and end of each round. Keep playing the game for about fifteen rounds. 10. When the game is called off, discuss with students what happened during the activity. How did the herd of elk change through the game? How did the habitat components change as the elk population

	changed? 11. See if any students have any hypothesizes about how the elk population fluctuated through out the game (see if a student would volunteer drawing a general line showing their hypothesis on the board, or flip chart). Record the data that resulted from each round. Each round represents one year. Then have students graph, or do it together as a class, the results. Wrap-Up 12. Some possible discussion questions to ask for students to summarize some of the things they learned would include: • What do animals need to survive? • How do these components influence carrying capacity? • What are some of the different limiting factors that could effect a population of animals? • How do these factors affect competition within a species, for example what would one animal have to do in order to make sure his/her "neighbor" didn't get all the food? Is nature ever really in balance or are ecological systems involved in a process of constant change?
Suggested Assessment	After playing the game a round or two stop and have students start a formal lab report for the game. Have them come up with a hypothesis as to what will result at the end of the game, then at the end of the game write up their observations, data chart, and conclusions as to the relationship between habitat components and wapiti.
Adaptations	Introduce a predator to the game (which could a human hunter, coyote, or mountain lion). Give the predator a "den" or corner where he/she waits for the count of 5 after "wild wapiti" is called. The predator can only hop on one leg or skip over to an elk that has not gotten its food, water, or shelter yet. The tagged elk is either out, becomes a predator for the next round, or becomes a habitat component for the next round. If the tagged elk becomes a predator, make sure to record the number of predators as well before and after each round. Then on the graph a separate line can represent the predator population.
References/ Resources	Council for Environmental Education. (2008). Project Wild: K-12 Curriculum and Activity Guide. Houston, TX: Author. Mathews, Daniel. (1999). Cascade-Olympic Natural History: A Trailside Reference. Portland, OR: Raven Editions. Wuerthner, George. (2000). Mount Rainier: A Visitor's Companion. Mechanicsburg, PA: Stackpole Books.